Laser Safety

References: 1.)AR 385-9

2.)USASC SH

3.)ANSI Standard Z136.1-1993

4.)Technical Guide No.153, Guidelines for Controlling Potential Health Hazards from Radiofrequency Radiation, April 1987

CW3
Callahan

Definition

LASER is a source of intense, coherent and directional optical radiation. Also, an acronym for Light Amplification by Stimulated Emission of Radiation. In common usage, a laser is a device that produces an intense, narrow beam of light. Normally each laser can only produce a single frequency or color of radiation. However, there are many different types of lasers. Some produce light which is in the

Laser Types

- **Class 1**
- **Class 2**
- **Class 3**
- **Class 4**
- **Class 5**

Class 1

- Lasers not capable of emitting hazardous radiation under any operating or viewing conditions. May be enclosed.
- REQUIREMENTS: Labeling
  Interlocks on case

Class 2

- Continuous wave, low power visible lasers.
- Avoid staring continuously into the beam.
- MOMENTARY exposure is not considered hazardous
- REQUIREMENTS: Labeling

  “Caution do not stare directly into beam”

Class 3a

- GENERALLY not hazardous unless beam is viewed with magnifying optics

  (Eyeglasses, etc.)

Class 3b

- Potentially hazardous if the direct or specularly reflected beam is viewed by the unprotected eye.
- Does not pose a diffuse reflection hazard.
- Avoid direct viewing and specular (mirror-like) reflections.

Class 3 & 4 Requirements

- Labeling
- Operate on approved laser range only
- Lase only approved targets
- Use a laser backstop
- Use eye protection in target area
- Use warning signs

Class 3a & b

- Pen type laser pointers:
  - Hazard to unprotected eye of individuals looking directly at the beam.
  - Caution label:

    Blink reflex is theoretically enough protection to avoid damage.
  - Danger label:

    Momentary viewing can exceed threshold limits.

DANGER
LASER RADIATION-DO NOT POINT BEAM AT PEOPLE WHEN DEMONSTRATING OR CHECKING THE AIMING DEVICE.
LASER DIODE CLASS IIIA LASER PRODUCT.
WAVELENGTH 632 TO 670 Nm
5mWMax
THIS PRODUCT IS IN CONFORMITY WITH PERFORMANCE STANDARDS FOR LASER PRODUCTS UNDER 21 CFR PART 1040.

Class 4

- Pulsed visible and near-IR
- Capable of producing diffuse reflection, fire and skin hazards
- Require countermeasures to prevent exposure including eyewear and clothing.
- General safety requirements same as Class 3

Class 5

- Not in standard military use
- Capable of burning objects directly exposed to energy

OH-58D MMS

- Most powerful production laser in military use
- Class IV
- Nominal Ocular Hazard Distance:
  - 23 km for a single pulse
  - 35 km for multiple pulses
  - 56 km for a single pulse viewed through optics!

OH-58D MMS

- System Safety Features of the MMS:
  - No direct view optics (bino's)
  - Environmental cover may be used to contain LE
  - Boresight module is completely enclosed
  - Beam exit port is far above eye level
  - Laser ground sensor prevents lasing unless rotor speed is at or above 95%
  - Laser fire button must be continually pressed to continue firing

Medical Requirements

- ANSI Standard Z136.1-1993, ¶3.3.3.2:
  - Vision/Ocular assessments are required for personnel using Class 3b and Class 4 lasers and laser systems
  - Immediate opthalmic exams will be performed when there is a known or suspected laser overexposure.

Symptoms of Injury

- Reduction in visual acuity
- Pain
- Seeing bright flashes
- Coneal burns (visible)
- Retinal hemorrhage
- Irritated skin
  - Spontaneous fires and damage to optical instruments (NVG’s)are evidence of possible laser employment.

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Questions?